U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of the Chief Counsel

800 Independence Ave., S.W.
Washington, D.C. 20591

JAN 16 2009

Ms. Leisha Bell
Manager, Regulatory Affairs
Aircraft Owners and Pilots Association
421 Aviation Way
Frederick, Maryland 21701-4798

Dear Ms. Bell:

In a letter dated November 21, 2006 to the FAA Office of the Chief Counsel, Mr. Luis M. Gutierrez of your association requested the rescission of a letter of interpretation regarding flight in known icing conditions issued on June 6, 2006. On September 22, 2008, I withdrew that letter in its entirety. After considering the points you and other stakeholders have raised to the June 6, 2006 letter and to our Notice of Draft Letter of Interpretation on Known Icing Conditions published in the Federal Register on April 3, 2007 (72 FR 15931), I am issuing this interpretation.

Our letter of June 6, 2006 responded to a request by Mr. Robert J. Miller for a legal interpretation of "known ice" as it relates to flight operations in the context of general aviation. While various FAA regulations contain limitations on flight in known icing conditions, the regulatory provisions that most commonly affect operators of general aviation aircraft not approved and equipped for such operations apply the term only indirectly. Flight into known ice is not directly referenced in part 91 and known icing conditions are only referenced in subpart F, which applies to large and turbine-powered multiengine airplanes and fractional ownership program aircraft. However, there are provisions in other subparts within part 91 that require a pilot to consider the consequences of flying in such conditions.

- 14 CFR § 91.9(a) states that "no person may operate a civil aircraft without complying with the operating limitations specified in the approved Airplane or Rotorcraft Flight Manual...." These manuals may state that a particular aircraft type is not approved for flight in known icing conditions. We construe Mr. Miller's request as seeking clarification of the meaning of "known icing conditions" as that term appears in Airplane Flight Manuals (AFM) and Pilot Operating Handbooks for many general aviation aircraft.

- 14 CFR § 91.13(a) states that "[n]o person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another."

- 14 CFR § 91.103 specifies that "[e]ach pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include... "[f]or a flight under IFR or a flight not in the vicinity of the airport, weather reports and forecasts...."

Rather than specifically defining "known ice," the FAA defines "known or observed or detected ice accretion" in the Aeronautical Information Manual (AIM). In paragraph 7-1-22 of that manual the agency defines "known or observed or detected ice accretion" as "[a]ctual ice observed visually to be on the aircraft by the flight crew or identified by on-board sensors." Actual adhesion to the aircraft, rather than the existence of potential icing conditions, is the determinative factor in this definition. The FAA believes the term "known or observed or detected ice accretion" to be synonymous with the term "known ice" and that the agency's definition of that term is non-controversial.

The formation of structural ice requires two elements: 1) the presence of visible moisture, and 2) an aircraft surface temperature at or below zero degrees Celsius. The FAA does not necessarily consider the mere presence of clouds (which may only contain ice crystals) or other forms of visible moisture at temperatures at or below freezing to be conducive to the formation of known ice or to constitute known icing conditions. There are many variables that influence whether ice will actually be detected or observed, or will form on and adhere to an aircraft. The size of the water droplets, the shape of the airfoil, and the speed of the aircraft, among other factors, can make a critical difference in the initiation and growth of structural ice.

Most flight manuals and other related documents use the term "known icing conditions" rather than "known ice," a similar concept that has a different regulatory effect. "Known ice" involves the situation where ice formation is actually detected or observed. "Known icing conditions" involve instead circumstances where a reasonable pilot would expect a substantial likelihood of ice formation on the aircraft based upon all information available to that pilot. While "known icing conditions" are not defined by regulation, the term has been used in legal proceedings involving violations of FAA safety regulations that relate to in-flight icing. The National Transportation Safety Board (NTSB) has held on a number of occasions that known icing conditions exist when a pilot knows or reasonably should know about weather reports in which icing conditions are reported or forecast. In those cases the pilots chose to continue their flights without implementing an icing exit strategy or an alternative course of action and the aircraft experienced heavy ice formation that validated the forecasted danger to the aircraft. The Board's decisions are consistent with the FAA's long-held position in enforcement actions that a pilot must consider the reasonable likelihood of encountering ice when operating an aircraft.

Notwithstanding the references to "weather forecasts" in various NTSB decisions, we emphasize that area forecasts alone are generally too broad to adequately inform a pilot of known icing conditions. Such forecasts may cover a large geographic area or represent too long a span of time to be particularly useful to a pilot. The forecasts in the cited decisions involved very specific information that alerted pilots to a substantial danger of severe icing.

Any assessment of known icing conditions is necessarily fact-specific. Permutations on the type, combination, and strength of meteorological elements that signify or negate the presence of known icing conditions are too numerous to describe exhaustively in this letter. Whether a pilot has operated into known icing conditions contrary to any limitation will depend upon the total information available to the pilot, and his or her proper analysis of that information in evaluating the risk of encountering known icing conditions during a particular operation. The pilot should consider factors such as the route of flight, flight altitude, and time of flight when making such an evaluation.

Pilots should also carefully evaluate all of the available meteorological information relevant to a proposed flight, including applicable surface observations, temperatures aloft, terminal and area forecasts, AIRMETs, SIGMETs, and pilot reports (PIREPs). As new technology becomes available, pilots should incorporate the use of that technology into their decision-making process. If the composite information indicates to a reasonable and prudent pilot that he or she will be operating the aircraft under conditions that will cause ice to adhere to the aircraft along the proposed route and altitude of flight, then known icing conditions likely exist. If the pilot operates the aircraft in known icing conditions contrary to the requirements of § 91.9(a), the FAA may take enforcement action.[1]

Flight in known icing conditions by aircraft not approved and equipped for such operations presents a significant safety hazard because by the time the ice adheres to the aircraft, it may be too late for the pilot to take actions to assure the further safety of the flight. The agency's goal is to encourage proper flight planning in advance and to avoid unwarranted risk-taking based upon the possibility that forecasts and reports are in error.

As a result, flight which results in the formation of ice on an aircraft is not the sole factor the FAA will use in determining whether enforcement action is warranted in any particular case. In determining whether enforcement action is warranted, the FAA will evaluate those actions taken by the pilot (including both pre-flight actions and those taken during the flight) to determine if the pilot's actions were, in fact, reasonable in light of §§ 91.9(a), 91.13(a), and 91.103.[2] The FAA will specifically evaluate all weather information available to the pilot and determine whether the pilot's pre-flight planning took into account the possibility of ice formation, alternative courses of action to avoid known icing conditions and, if ice actually formed on the aircraft, what steps were taken by the pilot to exit those conditions.

In accordance with the discussion of "known icing conditions" contained in this interpretation, I also note that the definition of "known icing conditions" currently found in paragraph 7-1-22 of the AIM defines that term as "atmospheric conditions in which the

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[1] Enforcement action could also be taken for operation of an aircraft into icing conditions that exceed the permissible icing certification limitations of the aircraft.

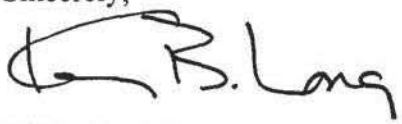
[2] Meteorological information that does not evidence known icing conditions, or the extent thereof, may regardless support a finding that a pilot's operation under the circumstances was careless if a reasonable and prudent pilot would not have operated the aircraft in those conditions under similar circumstances.

formation of ice is observed or detected in flight." That definition is not sufficiently broad to reflect the agency's position as set forth in this interpretation. The FAA will initiate action to revise the definition to reflect the interpretation articulated in this letter.

Pilots should not expose themselves or others to the risk associated with flying into conditions in which ice is likely to adhere to an aircraft. If ice is detected or observed along the route of flight, the pilot should have a viable exit strategy and immediately implement that strategy so that the flight may safely continue to its intended destination or terminate at an alternate landing facility. If icing is encountered by a pilot when operating an aircraft not approved or equipped for flight in known icing conditions, the FAA strongly encourages the submission of PIREPs and immediate requests to ATC for assistance. Such actions can significantly enhance safety, reduce accidents, and benefit the entire aviation community.

This response constitutes an interpretation of the Chief Counsel and was coordinated with the FAA's Flight Standards Service.

Sincerely,



Kerry B. Long
Chief Counsel